Executive Summary

ES.1 Proposed Action

The Federal Highway Administration (FHWA) and the Indiana Department of Transportation (INDOT) are proposing an improvement of the existing US 31 Corridor as a freeway between US 30 in Plymouth to the southern junction of US 31 and US 20 in South Bend, Indiana. The DEIS identifies Alternatives Cs, Es, and G-C as the alternatives that were studied in detail for impacts to the natural and human environment.

ES.2 Project Description

This US 31 Improvement Project is located in Marshall and St. Joseph counties, Indiana between US 30 in Plymouth and the southern junction of US 31 and US 20 in South Bend. The US 31 improvement corridor is approximately 20 miles in length. The communities of LaPaz, Lakeville, and the south edge of South Bend are within the limits of the project study area. Due to the fact that US 30 and US 20 are both functionally classified as principal arterials on the National Highway System (NHS) and Statewide Mobility Corridors in the INDOT 2000-2025 Long Range Plan, they serve as logical termini for examining the need to improve this portion of US 31. Additionally, US 30 represents a major carrier of east-west traffic, and is a logical origin and destination point for through traffic on US 31. US 20 represents the last major east-west arterial within the study corridor, and US 31 follows the US 20 Bypass to the west while Old US 31 continues northward from the US 31 and US 20 interchange into the South Bend Metropolitan Area.

ES.3 Purpose and Need

A Purpose and Need Statement for the US 31 Improvement from Plymouth to South Bend in Marshall and St. Joseph counties, Indiana, was drafted in March of 2003. It was presented at a Community Advisory Committee (CAC) and at a Public Information Meeting on April 10, 2003, and at an Interagency Review Meeting on May 15, 2003. The Purpose and Need Statement was subsequently revised based on projections for the year 2030 and on comments received from the public and resource agencies.

Project Need Statement

Transportation improvements to US 31 between US 30 and its southern junction with US 20 are needed for the following reasons:

Reduce Traffic Congestion

- For the year 2002, three out of the four signalized intersections operate at an unacceptable level-of-service (LOS) of traffic operations during the AM and/or PM peak hours.
- In the year 2030, all currently signalized intersections will operate at an unacceptable LOS.
- For the year 2000, five out of eight segments of US 31 operate at an unacceptable LOS.
- In the year 2030, all segments of US 31 will operate at an unacceptable LOS, with the one exception being the segment between US 30 and Michigan Road.

Note: Level-of-Service (LOS) describes a measure of congestion on roadways. LOS ranges from A to F, with LOS A indicating the least traffic congestion and LOS F indicating the most traffic congestion. INDOT standards state that an LOS C is the minimum acceptable for rural and suburban areas, and LOS B is desirable. For urban intermediate and built-up areas, an LOS D is the minimum acceptable, while an LOS C is desirable. Except for the segment from Miller Road (about three miles south of the US 20 Bypass) to the US 20 Bypass, the US 31 corridor is considered rural where an LOS falling below C is unacceptable.

Improve Safety

- Base year and projected future year total crash rates on US 31 exceed the statewide average for about half the length of the 20-mile corridor, including segments from US 6 through LaPaz, through Lakeville, and from Lakeville to US 20.
- Base year and projected future year injury crash rates or fatal crash rates on US 31 exceed the statewide average for 40% of the corridor length.

Consistency with Transportation Plans

- Existing US 31 lacks even partial access control for 15 miles from Michigan Road to the US 20 Bypass, where about 480 private driveways exist.
- Existing US 31 also lacks adequate median width for left-turns through LaPaz, and through Lakeville to the US 20 Bypass.

Project Purpose Statement

Based on the identified transportation needs, three overall project purposes (goals) have been established for the US 31 Improvement Project:

1) Purpose 1 (Congestion): Reduce congestion on US 31 by providing the capacity to meet the forecasted travel demand for 2030 at an acceptable LOS.
2) Purpose 2 (Safety): Improve safety on US 31 between US 30 and US 20.
3) Purpose 3 (Consistency with Transportation Plans): Determine consistency with statewide (INDOT) and regional (Michiana Area Council of Governments (MACOG)) transportation plans. MACOG is the South Bend Area Metropolitan Planning Organization (MPO). Project Alternatives will not be required to meet the third criterion in order to satisfy purpose and need.

Evaluation Criteria for Meeting Purpose and Need

Specific objectives and performance measures have been developed for each of the three identified purposes. The three purposes of the project and the performance measures for each are listed below.

Purpose 1 (Congestion): Reduce congestion on US 31 by providing the capacity to meet the forecasted travel demand for 2030 at an acceptable level-of-service (LOS).

Performance Measures:

- Achievement of an LOS in rural and suburban areas of C (B is preferable) and in urban intermediate/built-up areas of no less than D (C is preferable) on US 31 between US 30 and US 20.

- Reduction in the amount of congested vehicle-miles of travel and congested vehicle-hours of travel in the South Bend metropolitan area.

Purpose 2 (Safety): Improve safety on US 31 between US 30 and US 20.

Performance Measures:

- Reduction in the risk of fatal, injury, and property damage only (PDO) crashes to crash rate levels at or below statewide averages for this type of facility associated with travel on US 31 between US 30 and US 20.

- Reduction in fatal, injury, and PDO crashes to crash rate levels at or below statewide averages for this type of facility in the South Bend metropolitan area.

Purpose 3 (Consistency with Transportation Plans): Determine consistency with the statewide (INDOT) and regional (MACOG) transportation plans.

Performance Measures:

- Determine consistency with the INDOT 2000-2025 Long Range Transportation Plan for Statewide Mobility Corridors and consistency with the MACOG Transportation Plan. Project Alternatives will not be required to meet this criterion in order to satisfy purpose and need.

ES.4 Alternatives

Preliminary Alternatives and Screening

The development of the alternatives for the US 31 Improvement Project began with a broad examination of potential solutions to the transportation needs in the US 31 Corridor. The current transportation system, existing and projected traffic conditions, and the mobility needs for the State of Indiana and the South Bend metropolitan area were examined in determining the purpose and need for the project. The major concerns were increasing traffic congestion, deteriorating safety conditions, and poor statewide mobility.

The alternatives considered include:

- No-Build – existing roadway network plus programmed major roadway improvements in the South Bend Area,

- Travel Demand Management (TDM) – actions to spread peak hours of travel,

- Transportation System Management (TSM) – low-cost improvements to improve traffic flow,

- Intelligent Transportation System (ITS) Applications – technology-based programs to manage roadway system,

- Mass Transit – rail or bus service,

- Highway Build Alternatives,
    - Non-Freeway,
    - Freeway (Alternatives A – K).

Figure ES.4-1 shows the eleven preliminary freeway alternatives.

Each of the alternatives developed for the US 31 Improvement Project, from Plymouth to South Bend, was evaluated to determine if it would be carried forward for evaluation in the Draft Environmental Impact Statement (DEIS). A two-phase process was used to screen each alternative. Phase 1 screened alternatives with respect to purpose and need, while Phase 2 screened alternatives with respect to potential social and environmental impacts. Only those alternatives that met the purpose and need of the project in the Phase 1 analysis were advanced to Phase 2 of the screening process.

Phase 1: Purpose and Need

The first phase of the screening process analyzed the alternatives with respect to the Purpose and Need Statement for this project. To meet the purpose and need for this project, an alternative would have to meet the first two of the three purposes/needs for the project. To satisfy the first purpose and need for this project, an alternative would have to reduce congestion on existing US 31 by providing the capacity to meet the forecasted travel demand for 2030 at an acceptable LOS. A secondary measure of comparison related to congestion for an alternative would be the reduction in the amount of congested vehicle-miles of travel (VMT) and congested vehicle-hours of travel (VHT) in the South Bend Metropolitan Area. To satisfy the second purpose and need for this project, an alternative would have to improve safety on existing US 31 between US 30 and US 20. This equates to a reduction in the risk of fatal, injury, and property damage only (PDO) accidents to crash rate levels at or below statewide averages for this type of facility associated with travel on existing US 31 between US 30 and US 20. For the third purpose and need for this project, alternatives were evaluated to determine consistency with the INDOT 2000-2025 Long Range Transportation Plan for Statewide Mobility Corridors as well as consistency with the MACOG Transportation Plan. Alternatives were not required to meet the third criterion in order to satisfy purpose and need.

If an alternative clearly did not satisfy the project's purpose and need, it was not advanced to Phase 2 of the screening process. Alternatives that did meet the project's purpose and need were advanced to Phase 2 of the screening process.

During the first phase of the screening process, the No-Build, TDM, TSM, ITS, Mass Transit, Non-Freeway Alternatives, and Freeway Alternatives A, B, H, I and K were eliminated due to not meeting the purpose and need of the project (Table ES.4.1). Alternatives C, D, E, F, G, and J met the project purpose and need and were carried forward for further analysis in the second phase of the screening process.

Phase 2: Environmental Impacts

The second phase of the screening process analyzed the socio-economic and environmental impacts of the alternatives that were advanced from the purpose and need evaluation in Phase 1 of the screening process (Table ES.4.2). Environmental information used in this phase of the screening process was collected from existing sources and preliminary windshield and field surveys. A 300-foot wide "working alignment" (using the approximate centerline of each 2000-foot wide "corridor") was used to determine potential impacts to social, economic, and environmental resources for each alternative. Depending on the expected type of interchange, a 500-foot or 1000- foot radius circle

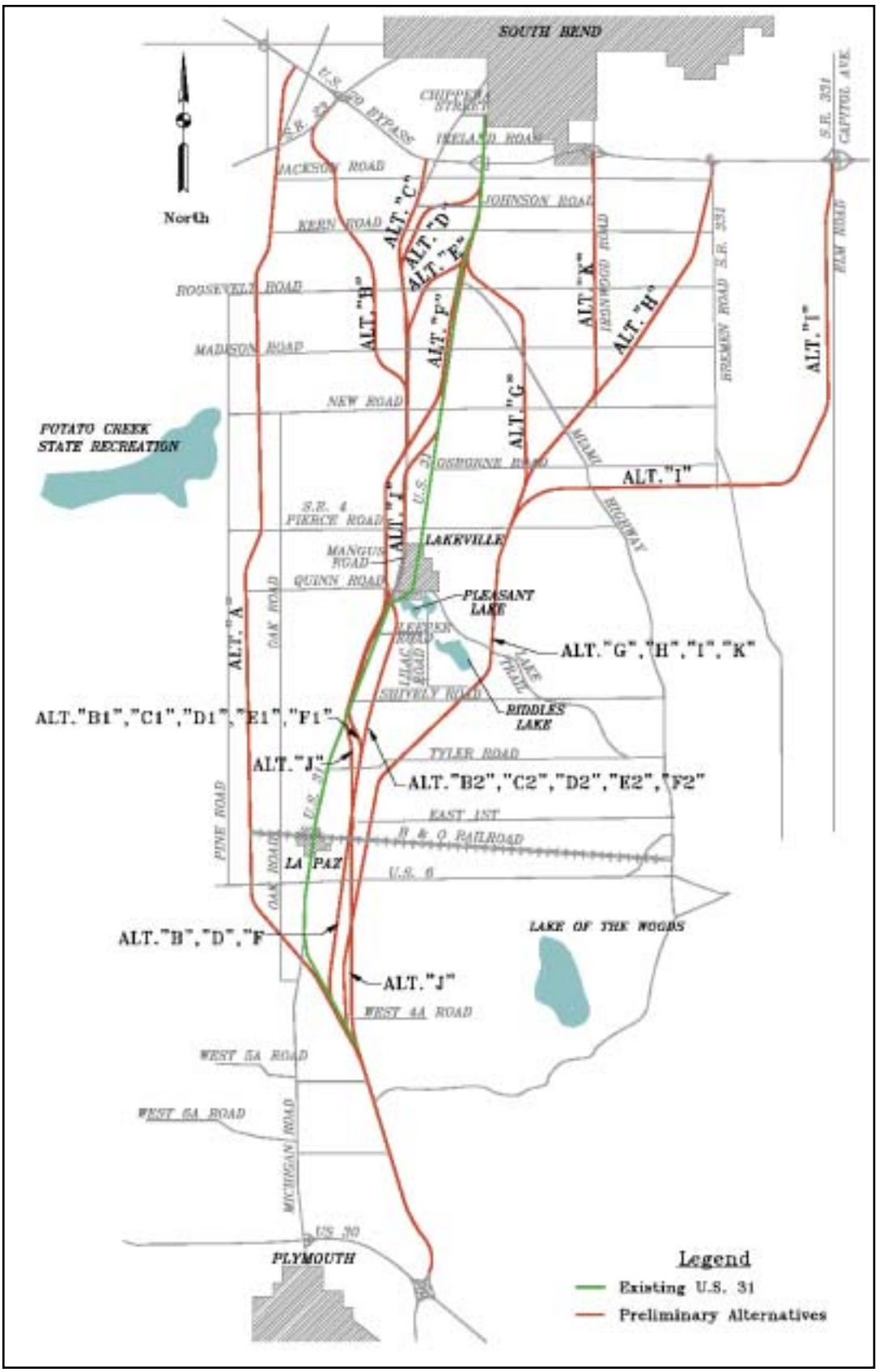

Figure ES.4.1: Preliminary Freeway Alternatives (A - K)

Table ES.4.1: Phase 1: Purpose and Need Evaluation

PHASE 1 – PURPOSE AND NEED EVALUATION				
Alternative	Reduces Congestion On Existing US 31 (Acceptable LOS for all segments)[1]	Improves Safety[2]	Consistent with INDOT & MACOG Transportation Plans[3]	Advanced to Phase 2 Screening
No-Build	NO	NO	NO	NO
TDM	NO	NO	NO	NO
TSM	NO	NO	NO	NO
ITS	NO	NO	NO	NO
Mass Transit	NO	NO	NO	NO
Non-Freeway Alternatives	NO	YES	NO	NO
Freeway Alternatives				
Alternative A	NO	NO	YES	NO
Alternative B	NO	NO	YES	NO
Alternative C	YES	YES	YES	YES
Alternative D	YES	YES	YES	YES
Alternative E	YES	YES	YES	YES
Alternative F	YES	YES	YES	YES
Alternative G	YES	YES	YES	YES
Alternative H	NO	NO	YES	NO
Alternative I	NO	NO	YES	NO
Alternative J	YES	YES	YES	YES
Alternative K	NO	YES	YES	NO

NOTES: Alternatives recommended for advancement to Phase 2 screening shaded.
1. An LOS C is the minimum acceptable for rural segments. An LOS D is the minimum acceptable for urban segments.
2. Crash rates at or below Indiana average for rural principal arterials.
3. Alternatives were not eliminated solely on their ability to meet this criterion.

Table ES.4.2: Potential Socio-Economic and Environmental Impact Evaluation For Alternatives Advanced to Phase 2 of Screening Process

Socio-Economic and/or Environmental Measure	Alternative Location									
	Western						Central			Eastern
	C1	C2	D1	D2	E1	E2	F1	F2	J	G
Preliminary Average Cost Estimate (million $)	253	245	263	255	278	266	325	313	346	283
New Right-of-Way (acres)	1050	1071	1130	1152	985	1008	917	961	857	1043
Forest (acres)	162	196	146	178	114	148	75	111	55	117
Wetlands (acres)	77	85	74	81	74	82	48	57	28	43
Floodplains (acres)	11	11	11	11	11	11	11	11	11	35
Streams Impacted	11	12	12	13	11	12	8	9	8	12
Potential 4(f) Property Impacts	2	0	2	1	5	3	5	3	5	4
Managed Land Impacts	5	7	6	8	6	8	5	7	4	5
Unique Geological/ Ecological Area	M	M	M	M	M	M	L	L	L	L
Farmland (acres)	824	810	809	797	755	742	727	731	702	833
Notable Wildlife Habitat (IDNR)	2	2	2	2	2	2	1	1	0	1
Residential Relocations	78	48	155	125	146	116	202	172	235	113
Farm Relocations	8	4	8	4	8	4	10	6	10	8
Business Relocations	11	8	46	43	84	81	94	91	86	80
Environmental Justice Issues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Well-Head Protection Area Impacts	4	4	4	4	3	3	2	2	2	0
Archaeology Impacts (Previously Surveyed)	4	2	4	2	4	2	4	2	3	2
Historic Property Impacts (on NR or PE)*	2	2	0	0	1	1	1	1	2	2
Cemeteries Impacted	0	0	0	0	2	2	4	4	4	2
Potential Residential Noise Impacts	69	54	115	101	82	66	105	88	146	66
Hazardous Material Site Impacts	0	0	6	6	10	10	11	11	13	10
Carried Forward for Detailed Study in DEIS***	No	Yes	No	No	No	Yes	No	Yes	No	Yes

NOTES:
Alternatives recommended for further study shaded.
* Historic Property Impacts include those properties listed on or potentially eligible for the National Register, that fall within the 2000-foot corridor for each alternative. These numbers are representative of potential Section 106 impacts.
**Alternatives' recommendations are discussed in detail in Section 3.1.7.
*** No-Build Alternative – does not meet purpose and need of the project; however, it will be carried forward for detailed study in the DEIS to serve as a baseline to compare to other alternatives.

was incorporated into the working alignment at the potential interchange location. This circle represents an approximation of an interchange footprint to be included in the area studied for potential impacts. The majority of the environmental screening was done using Geographic Information System (GIS) data. Preliminary windshield and field surveys were also used to collect information.

It is important to note that the US 31 Improvement Project has been a dynamic process. The information contained in Table ES.4.2 is from the best-known existing secondary source data and conceptual design parameters available at the time that the preliminary screening was conducted. Additional information was identified during a detailed field review later in the progress of the study, and the numbers contained in the detailed analysis of the alternatives studied further in the DEIS.

Freeway Alternatives B – F each consist of two options and are listed in the tables as B1, B2, C1, etc. The options are located south of Lakeville and each is approximately 3.4 miles in length. Option 1 follows existing US 31 from Shively Road to Quinn Road, for approximately 1.7 miles, before leaving the existing US 31 alignment just south of Lakeville. Option 2 follows the abandoned railroad corridor east of US 31, then crosses to the west of the existing US 31 alignment south of Lakeville. Option 1 would retain the existing southbound US 31 lanes as a two-way local service road, incorporate the northbound lanes into the freeway, and add a two-way frontage road from Shively Road to Leeper Road on the east side of the new freeway. The screening process for Options 1 and 2 differed from that of the individual freeway alternatives, Alternatives A – K, in that the differences in purpose and need measures are expected to be negligible. Thus, if a freeway alternative met all three purposes and needs identified for the project, both options were directly advanced to Phase 2 of the screening process, the socio-economic and environmental screening, and were viewed in terms of advantages and disadvantages. If a freeway alternative did not meet all three purposes and needs identified for the project, the alternative, including both Options 1 and 2, was not advanced to Phase 2 of the screening process and was eliminated from further consideration. This was the case for Alternative B, which did not meet all three purposes and needs for the project. Alternatives C – F did meet all three purposes and needs for the project. Given the higher residential, farm, and business relocations, impacts to potential historic sites, and higher overall cost, Option 1 was not advanced for further study. Thus, Option 2 was used for the further screening of Alternatives C through F.

Alternatives D and J were eliminated due to environmental impacts when compared to the other alternatives. Alternative D crosses through the large Whispering Hills subdivision, resulting in a high number of residential relocations and neighborhood impacts. Alternative D also connects to existing US 31 approximately 1/3 of a mile south of the existing US 20 interchange through very tight curves from the proposed Kern Road interchange. The proximity to the existing interchange and tight curves makes it extremely difficult for existing US 31 traffic to enter the freeway north of the proposed Kern Road. Due to the insufficient geometrics, the relocations, and neighborhood impacts, Alternative D was eliminated from further consideration.

Alternative J was one of the best performers with regard to the purpose and need measures. Generally, the more an alternative utilized portions of existing US 31, the better it performed; and Alternative J utilized more of the existing US 31 alignment than any other alternative. Alternative J also generally had the lowest impacts to the natural environment, as less new right-of-way would be required. However, this alternative also had the highest residential relocations and the highest cost among the alternatives.

Alternative J would require 235 residential relocations; 2 to 6 times more residential relocations than any of the other freeway alternatives, as well as 86 business relocations. In addition, it would significantly impact two closely situated Local Historical Landmarks along existing US 31; the Italianate-style Ullery/Farneman House (c. 1860), which has been deemed eligible for listing in the National Register, and the Southlawn Cemetery (including the small caretaker's building). Alternative J is adjacent to both Newton Park in Lakeville and LaVille Jr.-Sr. High School. Shifting Alternative J to the west to avoid the park and school would make it essentially the same as Alternatives B, C, D, E,

and F, of which Alternatives C, E, and F have been carried forward for further analysis. In conclusion, Alternative J, although a high performer in regard to purpose and need, was eliminated due to the high relocations, significant impacts to Local Historic Landmarks, impacts to Newton Park and the LaVille Jr.-Sr High School, and high cost.

Based on the findings of the Preliminary Alternatives Analysis and Screening, the No-Build Alternative, Alternative C, Alternative E, Alternative F, and Alternative G were further studied in the DEIS.

Modifications of Alternatives Recommended for Further Analysis

Following the completion of the Preliminary Alternatives Analysis and Screening, Alternatives C, E, F, and G were modified due to major concerns raised by the study team, public, elected officials, resource agencies and Section 106 consulting parties. These concerns focused on both socio-economic and environmental impacts, particularly concerns related to wetland impacts, residential and business relocations, and historic property impacts. The goal of the modifications was to minimize these impacts.

One of the main issues driving the alternative modifications is the existence of two historically significant sites located along existing US 31, in the area just south of the US 31 and Kern Road intersection. Alternatives E, F, and G all pass between these historic sites, along existing US 31, and would have major impacts to both properties. The historically significant sites are the Ullery/Farneman House on the west side of US 31, which has been deemed eligible for listing in the National Register, and the Southlawn Cemetery on the east side of US 31, a Local Historic Landmark.

Modifications to Alternative F

Modifications to Alternative F were investigated just south of the Ullery/Farneman House and the Southlawn Cemetery, and came about in an attempt to minimize impacts to the sites and to eliminate the likely Section 4(f) impacts. Modified Alternative F in this area involved a shift to the west to go behind the Ullery/Farneman House. Westward modifications to Alternative F would significantly impact two residential subdivisions; one just north of Madison Road and west of US 31 and the other at Roosevelt Road and west of US 31. Further modifications to Alternative F that would relocate it farther west, in an attempt to avoid these two subdivisions, would essentially place the modified Alternative F on top of Alternative E and/or Alternative Es. For this reason, modified Alternative F was eliminated from further consideration.

Modifications to Alternatives C and E

Alternatives C and E follow the same alignment from the US 30 and US 31 interchange to just north of Madison Road. Any modification made to either of these alternatives in this area, aimed at minimizing impacts, would be made to both of the alternatives. Just north of Madison Road, Alternatives C and E diverge and follow separate alignments northward to US 20. Thus, modifications made to one alternative or the other north of Madison Road would be independent. Each of the alternatives contains three separate areas in which modifications have been made in an attempt to minimize impacts.

- The southern segment of the modifications to Alternatives C and E extends from West 4A Road to the south edge of Lakeville. This alignment modification involved the shift of Alternative C, to be called Alternative Cs, and Alternative E, to be called Alternative Es, to the east. The modified Alternatives Cs and Es were shifted to follow Alternative G from West 4A Road to just south of Tyler Road.
    - These modifications reduced wetland impacts by 50% in this area while having a modest impact on relocations and no impact to historic properties.

    - These alignment modifications were included in the alternatives carried forward for detailed study in the DEIS.

- The central segment of the modifications to Alternatives C and E extends from SR 4 (Pierce Road) to just north of Osborne Road. This modification involved the shift of the two alternatives to the east. Alternatives Cs and Es continue northward and connect with Alternatives C and E just north of Osborne Road.

    - These modifications reduce the wetland impacts by one acre and had no impact on residential relocations or to historic properties. The one acre of wetland reduction in this segment is a particularly high quality wetland.

    - These alignment modifications were included in the alternatives carried forward for detailed study in the DEIS.

- The northern segment of the modifications to Alternative C, called Alternative Cs, extends from just north of Madison Road to US 20. This modification involved the shift of the alternative to the east.

    - This modification increased the wetland impacts by seven acres and had no impact on residential relocations or to historic properties. Due to the increases in wetland impacts, in this segment, this modification to Alternatives C was not carried forward for more detailed study in the DEIS.

- The northern segment of the modifications to Alternative E, called Alternative Es, extends from just north of Madison Road to US 20. This modification involved the shift of the alternative to the west.

    - This modification, relocating it to the west and behind the Ullery/Farneman House, reduced the wetland impacts by 12 acres, decreased residential relocations by 23 and business relocations by 20, and eliminated the Section 4(f) issue related to historic properties. Due to these reasons, in this segment, Alternatives Es is being carried forward for more detailed studies in the DEIS.

Modifications to Alternatives G

Two separate modifications to Alternative G were investigated, Alternatives Gs and G-C. Both of the modified alternatives follow Alternative G from the existing US 30 and US 31 interchange to Lake Trail, just east of Riddles Lake. At that point, the alternatives diverge as Alternative G goes northeast while Alternatives Gs and G-C continue northward on a common alignment, just east of and parallel to Kenilworth Road. Just north of Miller Road and south of Turkey Trail, Alternatives Gs and G-C turn to the northwest and parallel Turkey Trail. As these two alternatives approach existing US 31 they diverge. Alternative Gs turns northward and ties into existing US 31 at Roosevelt Road. It continues northward along existing US 31 connects to Alternative G south of Kern Road and terminates at the existing US 31 and US 20 interchange. Alternative G-C continues northeast, crosses existing US 31 near Roosevelt Road and ties into Alternative C near Kern Road. From that point, Alternative G-C continues northward, following the same alignment as Alternative C, and terminates at US 20.

The socio-economic and environmental impacts of modified Alternatives Gs and G-C were compared to those of Alternative G.

- Alternative Gs reduced the wetland impacts by four acres, increased residential relocations by 33 and business relocations by two, and reduced the historic impacts to those structures located within the area of potential impact (APE) by three. It did not eliminate the Section 4(f) issue related to the Ullery/Farneman House and the Southlawn Cemetery.

- Alternative G-C increased wetland impacts by nine acres, a 26% increase. However, it reduced residential relocations by 31 (a 32% reduction) and business relocations by 43, (an 83% reduction). Alternative G-C reduced the historic impacts to those structures located within the APE by two and it eliminated the Section 4(f) issue related to the Ullery/Farneman House and Southlawn Cemetery.

Due to reductions in both residential and business relocations, and the elimination of the Section 4(f) issue related to historic properties, Alternative G-C was carried forward for more detailed study in the DEIS.

Description of the Alternatives Selected for Detailed Study

The No-Build Alternative and three Freeway Alternatives Cs, Es, and G-C (Figure ES.4.2), were selected for detailed study in the DEIS.

No-Build Alternative

The No-Build Alternative includes capacity expansion projects in the South Bend Metropolitan Area (St. Joseph, Marshall, and Elkhart counties) as reported in the MACOG Transportation Improvement Program (2003-2005 TIP) and throughout Indiana as reported in the Indiana Statewide Transportation Improvement Program (INSTIP). Capacity expansion projects include major roadway investments, such as a major widening that add through traffic lanes, the extension of existing roadways or construction of new roadways, new interchanges and major roadway realignments, or reconstructions that add through traffic carrying capacity.

The No-Build Alternative constitutes the existing roadway network of the year 2000 plus capacity expansion projects completed or programmed for completion since the year 2000. It is assumed that these programmed improvements are committed, and will be completed independent of any decision regarding the improvement of US 31 from Plymouth to South Bend.

Alternative Cs (Freeway Alternative)

Alternative Cs is a freeway upgrade of existing US 31 from the US 30 interchange to just north of West 4A Road. From West 4A Road, it is a new freeway that runs east of LaPaz and parallels US 31. It crosses existing US 31 on the south edge of Lakeville and continues northward. It runs west of Lakeville and terminates at US 20 approximately one mile west of the existing US 31 and US 20 interchange.

The proposed freeway would require existing intersections and access points to be converted to interchanges, grade separations (overpasses/underpasses), or access closures. It is anticipated that there will be five new interchanges along Alternative Cs, not including the use of the existing interchange at US 30. All anticipated interchange locations and types are conceptual and will be refined in later phases. Likely interchange locations and types would be:

- Utilize existing interchange at US 30,
- Diamond Interchange at West 5A Road,
- Diamond interchange at US 6,
- Diamond interchange at SR 4 (Pierce Road),
- Diamond interchange at Kern Road,
- Trumpet Interchange at US 20.

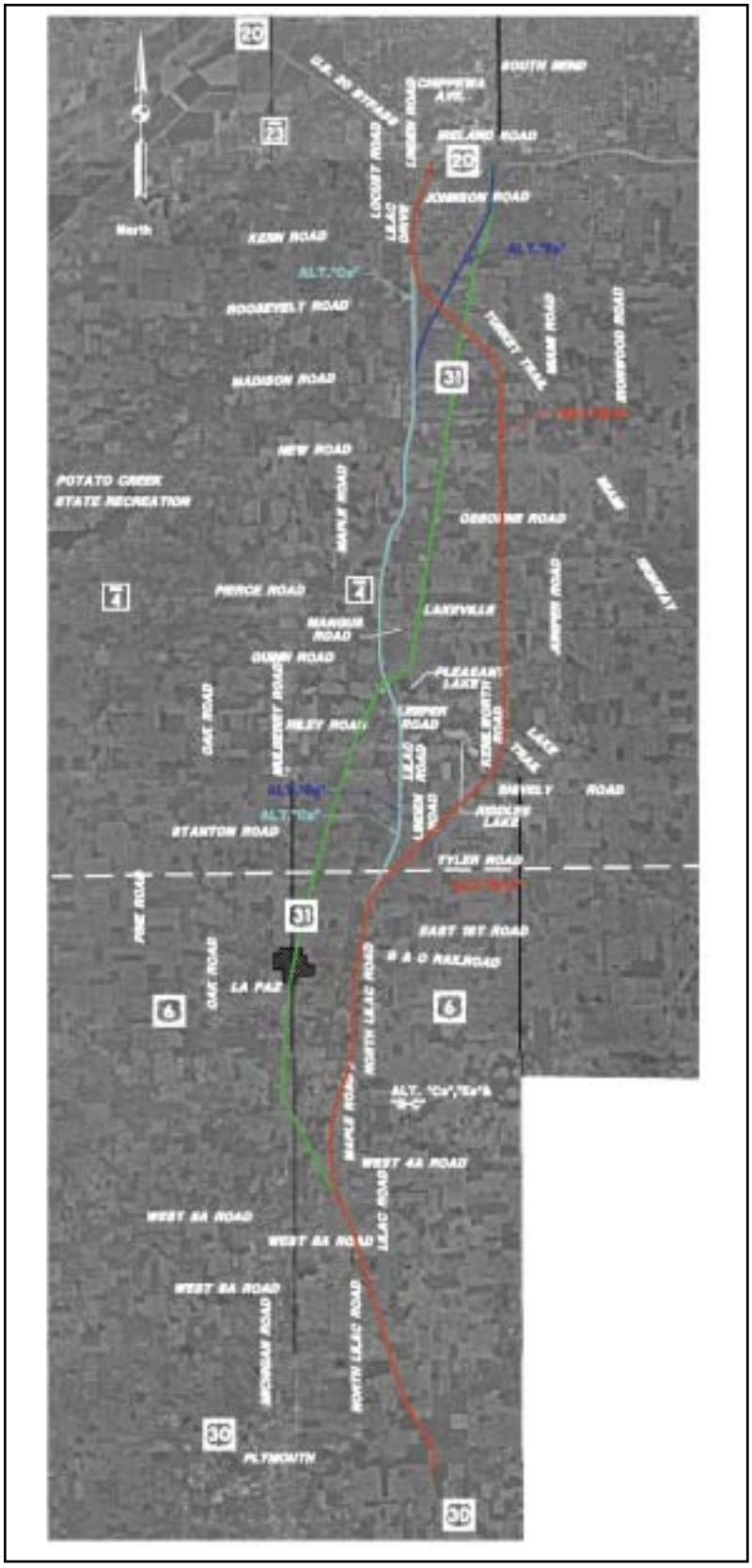

Figure ES.4.2: Alternatives Studied Further in the DEIS

It is anticipated that there will be ten grade separations (overpass/underpass) along Alternative Cs; however, the details of access will be refined as the project advances through the development phases. Likely grade separation locations would be:

- Plymouth-Goshen Trail,
- West 3A Road,
- Tyler Road,
- Leeper Road,
- Existing US 31 just south of Lakeville,
- Quinn Road,
- New Road,
- Madison Road,
- Roosevelt Road,
- Johnson Road.

Alternative Es (Freeway Alternative)

Alternative Es is a freeway upgrade of existing US 31 from the US 30 interchange to just north of West 4A Road. From West 4A Road, it is a new freeway that runs east of LaPaz and parallels US 31. It crosses existing US 31 on the south edge of Lakeville and continues northward. It runs west of Lakeville and ties into existing US 31 just north of Kern Road. Alternative Es terminates at the existing US 31 and US 20 interchange.

It is anticipated that there will be four new interchanges along Alternative Es, not including the use of the existing interchange at US 30. This alternative would also involve reconstruction of the existing interchange at US 20. All anticipated interchange locations and types are conceptual and will be refined in later phases. Likely interchange locations and types would be:

- Utilize existing interchange at US 30,
- Diamond Interchange at West 5A Road,
- Diamond interchange at US 6,
- Diamond interchange at SR 4 (Pierce Road),
- Diamond interchange at Kern Road,
- Reconstruction of existing interchange at US 20.

It is anticipated that there will be 11 grade separations along Alternative Es. However, the details of access will be refined as the project advances through the development phases. Likely grade separation locations would be:

- Plymouth-Goshen Trail,
- West 3A Road,
- Tyler Road,
- Leeper Road,
- Existing US 31 just south of Lakeville,
- Quinn Road,
- New Road,
- Madison Road,
- Roosevelt Road,
- Main Street,
- Johnson Road.

Alternative G-C (Freeway Alternative)

Alternative G-C is a freeway upgrade of existing US 31from the US 30 interchange to just north of West 4A Road. From West 4A Road, it is a new freeway that runs east of LaPaz and Lakeville and parallels US 31. It crosses existing US 31 south of Roosevelt Road, continues northward and terminates at US 20, approximately one mile west of the existing US 20 interchange, like Alternative Cs.

It is anticipated that there will be five new interchanges along Alternative G-C, not including the use of the existing interchange at US 30 and US 31. All anticipated interchange locations and types are conceptual and will be refined in later phases. Likely interchange locations and types would be:

- Utilize existing interchange at US 30,
- Diamond Interchange at West 5A Road,
- Diamond interchange at US 6,
- Diamond interchange at SR 4 (Pierce Road),
- Diamond interchange at Kern Road,
- Trumpet Interchange at US 20.

It is anticipated that there will be ten grade separations (overpass/underpass) along Alternative G-C. However, the details of access will be refined as the project advances through the development phases. Likely grade separation locations would be:

- Plymouth-Goshen Trail,
- West 3A Road,
- Tyler Road,
- Kenilworth Road,
- Lake Trail,
- New Road,
- Miller Road,
- Existing US 31 south of Kern Road,
- Roosevelt Road,
- Johnson Road.

ES.5 Identification of Alternatives Studied in Detail & Comparison of Impacts

Based on the following findings, Alternatives Cs, Es, and G-C have been identified as the alternatives to be studied in detail. Following the DEIS public comment period and the public hearing, the Final Environmental Impact Statement (FEIS) will be prepared identifying the selected action, which identifies the single preferred alternative.

A comparative summary of the socio-economic and environmental impacts of the three freeway alternatives, Alternatives Cs, Es, and G-C is contained in Table ES.5.3. Direct impacts typically include those that involve clearly observable, physical alteration of the land or water bodies as a result of construction activities within the proposed right-of-way. Impacts such as these may be permanent or temporary, and positive or negative in nature.

Temporary direct impacts typically occur in the right-of-way during construction activities. They usually result in physical effects but do not cause permanent alteration of the land or water bodies. Temporary easements, for example, may be required for access and storage of equipment on site.

Indirect impacts are those that occur as a result of a project action but are removed from the immediate right-of-way. The Federal Highway Administration (FHWA) defines indirect impacts as those that are "caused by an action and are later in time or farther removed in distance, but are still reasonably foreseeable." Generally these impacts are induced by the initial action. They comprise a wide variety of indirect impacts such as changes in land use, economic development, and population density. Cumulative effects are impacts that result from the "incremental consequences of an action when added to other past and reasonably foreseeable future actions…[They are]…less defined than indirect impacts…[and]….may be undetectable when viewed in the individual context of direct and even indirect impacts, but nonetheless can add to other disturbances and eventually lead to measurable environmental change." (FHWA)

Table ES.5.3: Comparison of Alternatives Studied in Detail

Socio-Economic/Environmental Measure	ALTERNATIVE		
	Cs	Es	G-C
COSTS (Total) (Mil. Of $) (year 2003 dollars)	**209.1 to 228.9**	**241.1 to 262.0**	**224.4 to 244.9**
Length (Miles)	19.4	19.9	20.4
No. of New Interchanges (Total Interchanges)	5 (7)	4 (6)	5 (7)
No. of Grade Separations (Overpass/Underpass)	10	11	10
No. of Grade Separations (Railroad Crossings)	1	1	1
CONSTRUCTION COSTS (Mil. of $)	152.3 to 171.5	165.8 to 185.9	163.5 to 183.2
RIGHT-OF-WAY COSTS (Mil. of $)	45.6	61.4	48.4
ENGINEERING COSTS (Mil. of $)	11.1 to 11.8	13.9 to 14.7	12.5 to 13.2
TRAFFIC PERFORMANCE			
Meet Purpose and Need	Yes	Yes	Yes
Performance (Compared to Other Alternatives)	Medium	High	Low
LAND USE	**960 Ac.**	**901 Ac.**	**998 Ac.**
Agricultural (row crop)	403 Ac.	406 Ac.	485 Ac.
Commercial	22 Ac.	20 Ac.	21 Ac.
Church/Religious	2 Ac.	2 Ac.	2 Ac.
Herbaceous Cover	41 Ac.	39 Ac.	56 Ac.
Open Water	1 Ac.	1 Ac.	2 Ac.
Pasture	14 Ac.	12 Ac.	3 Ac.
Transportation	187 Ac.	174 Ac.	187 Ac.
Residential	51 Ac.	70 Ac.	61 Ac.
Scrub/Shrub	43 Ac.	38 Ac.	42 Ac.
Woodland	196 Ac.	139 Ac.	139 Ac.
RELOCATIONS			
Residences Acquired	49	90	58
Businesses Acquired	8	32	6
Businesses Damaged	5	2	5
Churches Acquired	1	1	1
HISTORIC PROPERTIES	**Medium**	**Low**	**High**
SECTION 4(f)	**0**	**0**	**0**
ARCHAEOLOGICAL SITES			
Within Alignment	2	3	2
TOTAL WETLANDS (NWI + FARMED)	**57.7 Ac.**	**40.5 Ac.**	**45.3 Ac.**
WETLANDS (From NWI Maps)	55.9 Ac.	38.8 Ac.	42.7 Ac.
Forested	25.8 Ac.	20.8 Ac.	24.7 Ac.
Scrub/Shrub	3.0 Ac.	1.6 Ac.	1.4 Ac.
Emergent	26.3 Ac.	15.7 Ac.	15.6 Ac.
Aquatic Bed	0.8 Ac.	0.7 Ac.	1.0 Ac.
ESTIMATED FARMED WETLANDS	1.8 Ac.	1.7 Ac.	2.6 Ac.
STREAM IMPACTS (No. of Impact Locations)	**14**	**13**	**10**

Table ES.5.3 Continued: Comparison of Alternatives Studied in Detail

Socio-Economic/Environmental Measure	ALTERNATIVE		
	Cs	Es	G-C
WILDLIFE HABITAT AREAS			
Potato Creek State Park & Swamp Rose Nature Preserve	0	0	0
Notable Wildlife Habitat (IDNR)	2	1	0
Classified Wildlife Habitat (IDNR)	4	3	1
Classified Forest (IDNR)	2-3	2-3	1-2
Conservation Reserve Program (CRP) (NRCS)	1	2	2
Wetland Reserve Program (WRP) (NRCS)	1	1	0
Partners for Fish and Wildlife Program (USFWS)	3	2	1
INDIRECT IMPACTS			
Farmland	45 Ac.	35 Ac.	85 Ac.
Wetland	2 Ac.	2 Ac.	0 Ac.
Forests	25 Ac.	20 Ac.	5 Ac.

Note:
- All values are based on a 300-370 foot total right-of-way,
- Traffic Performance Comparison – High is best performer,
- Businesses Acquired includes large farming operations,
- Estimated Farmed Wetlands are calculated as 2% of all Hydric Soils on agricultural land

The No-Build Alternative, while having no *direct* construction costs or impacts, would result in indirect economic and quality of life impacts that can be expected from the continued deterioration of system capacity as identified in the Purpose and Need Statement.

Purpose and Need - Although Alternatives Cs, Es, and G-C all meet the purpose and need of the project, they perform at different levels with regard to reduction in congestion.

- Alternative Es is the best traffic performer, as it provides existing US 31 with an LOS of A from the southern terminus at the US 30 interchange to Roosevelt Road. From Roosevelt Road to the northern termini at US 20, the alternative provides an LOS of B.

- Alternative Cs provides existing US 31 with an LOS of A from the southern terminus at the US 30 interchange to Roosevelt Road. From Roosevelt Road to the northern termini at US 20, the alternative provides an LOS of D, the minimum acceptable LOS for an urban section, along existing US 31.

- Alternative G-C performs very similarly to Alternative Cs as it provides existing US 31 with an LOS of A from the southern terminus at the US 30 interchange to New Road. From New Road to Roosevelt Road the alternative provides an LOS of B along existing US 31. From Roosevelt Road to the northern termini at US 20, the alternative provides an LOS of D, the minimum acceptable LOS for an urban type section, along existing US.

Agricultural Land/Farmland Impacts - Farmland (row crop) impacts were based on 2002 aerial photographs:

- Alternatives Cs will impact an estimated 403 acres,
- Alternative Es will impact an estimated 406 acres,
- Alternative G-C will impact an estimated 485 acres, approximately 80 acres more than the other two alternatives.

Natural Resource Impacts - Based on calculations from the National Wetland Inventory (NWI) Maps:

- Alternative Es has the least amount of estimated wetland impacts at 38.8 acres,
- Alternative G-C has an estimated 42.7 acres of wetland impacts,
- Alternative Cs with the highest amount at 55.9 acres.

Forest (woodland) impacts were based off 2002 aerial photographs:

- Alternative Cs also had the highest forest (woodland) impacts with 196 acres,
- Alternative Es and G-C had the least with 139 acres impacted.

Alternatives Cs and Es traverse an area of complex glacial drift in the northwestern quarter of the study area, from approximately the north edge of Lakeville to US 20, formerly the Maxinkukee Moraine. The unique glacial deposits in this area are also unique from a wildlife habitat perspective. These areas are less conducive to agriculture, thus many forested and wetland communities remain. The majority of threatened and endangered species records from the Indiana Natural Heritage Data Center are from this area, as are many of the notable wildlife habitat areas as identified by the Indiana Department of Natural Resources (IDNR), and lands enrolled in state and federal programs that promote and manage wildlife habitat. Alternative G-C avoids this area for the most part, with the exception of the northern most portion from approximately Roosevelt Road to its northern terminus at US 20.

Based on calculations from digital Federal Emergency Management Agency (FEMA) floodplain data:

- Alternatives Cs and Es have an identical amount of potential floodplain impacts at 1,990 linear feet,
- Alternative G-C has approximately 4,305 linear feet of floodplain impacts.

Related to the floodplain impacts is the number of stream impacts noted for each of the alternatives:

- Alternatives Cs is estimated to impact 14 streams,
- Alternative Es will impact 13 streams,
- Alternative G-C has ten stream impacts,

Residential/Commercial Relocations - Relocations for each of the three alternatives vary:

- Alternative Es has the most residential relocations with 90,
- Alternative G-C has 58 residential relocations,
- Cs has the fewest at 49 residential relocations.

Differences in commercial relocations indicate that Alternative Es is substantially higher than Cs and G-C, which have essentially the same number.

- Alternative Es impacts a commercial corridor as it joins existing US 31 from just north of Kern road to US 20. Commercial relocations for Es are 32 businesses acquired and two businesses damaged.
- Alternative Cs has eight associated business relocations and five businesses damaged.
- Alternative G-C has the least impacts to businesses with six business relocations and five businesses damaged.

Historic and Archaeological Resources - Section 106 requires consultation with the State Historic Preservation Officer (SHPO) and other consulting parties to develop and evaluate alternatives or modifications that could avoid, minimize, or mitigate historic and archaeological effects.

- Consulting parties have been contacted on an ongoing basis in order to avoid and minimize the impacts of the undertaking on historic and archaeological properties.
- Mitigation of impacts may mean avoiding the impact altogether, minimizing the impact, rectifying the impact, reducing or eliminating the impact over time, or compensating for the impact.
- Following the determination of a final alternative, if FHWA concludes there is an adverse effect, an MOA will be drafted to address these effects. If necessary, the MOA will be included in the FEIS.

Air Quality - No violations of the NAAQS are projected for this project. Therefore, no air quality mitigation measures are required for the roadway improvements.

Noise – Noise impacts for each of the three alternatives indicate no conclusive advantage for any one of the alternatives. Each of the alternatives is close to some suburban neighborhoods in the north end of the project area.

- Alternative Cs is higher than the others with approximately 113 residences impacted. It should be noted that approximately 50 of the residences impacted by Alternative Cs are in very close proximity to each other as they are all located within a mobile home park off of Locust Road.
- Alternative Es impacts approximately 68 residences
- Alternative G-C impacts approximately 72 residents.

At all sensitive receivers where traffic noise impacts are predicted under the freeway alternatives, noise mitigation measures will be considered. The typical method of mitigating traffic noise impacts is to construct a noise barrier in the form of an earthen berm and/or vertical wall. According to INDOT's Highway Traffic Noise Policy, when

impacts have been identified, there must be consideration of any reasonable and feasible measures that would abate the traffic noise impacts.

- Five areas were evaluated for potential noise barrier reasonableness based on the relative density of housing and proximity to each of the proposed alternatives. Preliminary analysis indicates that all of the sites included benefited receivers when evaluated with barrier segments ranging from 10 to 14 feet in height. These preliminary results indicate that noise barriers may be required in some areas (e.g., Sun Communities Mobile Home Park on Locust Road and South Bend from Dice Street to US 20), and possibly not be required in other areas (e.g., along Maple Road, Madison Road, and Whispering Hills). Noise barrier impacts will be analyzed further and in greater detail in the final design phase, when a final alternative is selected.

- Additional noise abatement measures (altering vertical or horizontal alignment, eliminating truck traffic, and reducing vehicle speed limits) were evaluated and found to be either unwarranted or not feasible for any of the freeway alternatives.

Farmland - Agricultural impacts in the form of permanent conversion of farmland to non-farmland use generally cannot be mitigated easily by the creation of new farmland elsewhere. For this reason, the mitigation of agricultural impacts tends to focus on those practices that assist in avoiding and/or minimizing conversion, or designing alignments to minimize disruption to existing agricultural patterns. The following lists a few general practices that can be taken into consideration to avoid or minimize farmland impacts.

- Where reasonable, corridors should follow existing property lines and minimize dividing or splitting large tracts of farmland.

- Follow agricultural property lines as much as possible or cross fields at perpendicular angles to reduce point rows and the creation of uneconomic remnants.

- Work with local officials to control access through interchange locations. In so doing, subsequent development can possibly be directed away from large expanses of prime farmland, thus preserving this resource.

Section 4(f) Resources - This project involves no Section 4(f) use of any Section 4(f) resources.

Compatibility with Local Land Use Plans

- The Draft Plymouth Comprehensive Plan includes the upgrade of US 31.

- The Draft Marshall Thoroughfare Plan assumes the upgrade of existing US 31 throughout Marshall County.

- The South Bend and St. Joseph County Comprehensive Plan incorporates the land use plan for the local MPO, MACOG. The MPO land use plan identifies that area immediately south of the existing US 31 and US 20 interchange as an area expected to see residential growth in the future. It also identifies the portion of US 31 included in the study area as an area that would benefit from further study.

Indirect Impacts

- Alternative G-C is estimated to have the greatest amount of land conversion as indirect impacts, with a total of 90 acres. Of this, 85 acres are farmland and 5 acres are forest,
- Alternative Cs had the second highest amount of indirect land conversion, with 72 acres. Of this, 45 acres are farmland, 2 acres are wetlands, and 25 acres are forest,
- Alternative Es had the lowest amount of indirect land conversion, with 57 acres. Of this, 35 acres are farmland, 2 acres are wetlands, and 20 acres are forest.

Total Costs - Total costs associated with each of the three alternatives are very similar. These total costs include preliminary construction costs, preliminary right-of-way costs and preliminary engineering (design) costs.

- Alternative Cs has the lowest total cost between $209.1 and $228.9 million.
- Alternative G-C has a total cost between $224.4 and $244.9 million.
- Alternative Es has the highest total cost between $241.1 and $262.0 million.

A comparison of construction costs indicates:

- Alternative Cs has the lowest construction cost between $152.3 and $171.5 million.
- Alternatives G-C and Es have essentially the same construction costs with Alternative Es between $165.8 and $185.9 million, and Alternative G-C between $163.5 and $183.2 million.

The higher construction costs associated with Alternative G-C are largely due to the increased length, one mile longer than Alternative Cs. Although Alternatives Cs and Es are essentially the same from US 30 to just north of Madison Road, their construction costs differ fairly substantially. This difference is largely due to the additional costs associated with the urban typical section of Alternative Es from near Roosevelt Road to US 20. This urban typical section will consist of an elevated US 31 freeway and access roadways on both the east and west sides of the freeway. Alternative Cs would likely retain a rural typical section in the section from near Roosevelt Road and US 20 as is reflected in the lower construction cost.

A comparison of right-of-way cost indicates:

- Alternative Cs also has the lowest right-of way costs at approximately $45.6 million.
- Alternative G-C had a right-of-way cost of approximately $48.4 million, only slightly higher than Cs despite its longer length.
- Alternative Es, also with a higher construction cost, has the highest right-of-way costs at approximately $61.4 million.

Differences in the right-of way costs are largely due to the number and type of relocations associated with each alternative.

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